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CLAIMS

[Claim(s)]

[Claim 1] (a) Data read-out equipment for optical disks characterized by having a rotation driving means which carries out the rotation drive of the set optical disk (11), and a change means (21 26) which changes a rotary system of said optical disk (11) by the (b) aforementioned rotation driving means to CLV or CAV.

[Claim 2] (a) A rotation driving means which carries out the rotation drive of the set optical disk (11), (b) An access method judging means to judge any are more advantageous between a sequential access and random access about data read-out of an optical disk (11) set to said rotation driving means (20), and (c) -- a change means (21 26) which changes a rotary system of said optical disk (11) by said rotation driving means to CLV and CAV, respectively when said access method judging means (20) considers a sequential access and random access as a judgment, respectively for it to be advantageous -- Data read-out equipment for optical disks characterized by ****(ing).

[Claim 3] said access method judging means (20) has advantageous any of a sequential access and random access based on a class of said optical disk (11) -- data reading appearance for optical disks according to claim 2 characterized by performing that judgment -- carrying out -- equipment.

[Claim 4] said access method judging means (20) has advantageous any of a sequential access and random access based on a file type currently recorded on said optical disk (11), length, and/or the number -- data reading appearance for optical disks according to claim 3 characterized by performing that judgment -- carrying out -- equipment.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention is CD (Compact Disk and DVD (the data read-out equipment for optical disks which reads data from optical disks, such as Digital Versatile Disk, is started, and related with the data read-out equipment for optical disks which improves read-out of data in detail.)).

[0002]

[Description of the Prior Art] There are CLV (Constant Linear Velocity) and CAV (Constant Angular Velocity) in the rotary system of the disk in the optical disk player and the optical disk drive which read data from CD or DVD. In a conventional optical disk player or a conventional optical disk drive, either CLV and CAV are fixing the rotary system separately.

[0003]

[Problem(s) to be Solved by the Invention] In the optical disk player which reproduces voice and an image As opposed to CLV to which data will be continuously read for a long time from an optical disk, and the rotary system of an optical disk was suitable for the sequential access being more advantageous In the optical disk drive used for data read-out in a personal computer Like data read-out from dictionary CD-ROM, when reading much short files frequently, a metaphor Whenever the disk radial track location where the file which is going to read data as a rotary system is CLV is recorded changes While fluctuating the rotational speed of a spindle motor and leading to the fall of a transmission rate, it leads to the burden increase and power consumption increase of a spindle motor which are based on fluctuation of rotational speed, and the CAV is more advantageous.

[0004] The purpose of this invention is improving data read-out in the data read-out equipment for optical disks which reads data from an optical disk.

[0005]

[Means for Solving the Problem] Data read-out equipment for optical disks of this invention (10) has the following (a) and (b).

(a) A change means which changes a rotary system of an optical disk (11) by the rotation (driving means b) rotation driving means which carries out the rotation drive of the set optical disk (11) to CLV or CAV (21 26) [0006] A change to CLV or CAV in a change means (21 26) includes not only an automatic change but a change by manual operation by user. CD and DVD are contained in an optical disk (11) at least. An optical disk drive used for data read-out of not only an optical disk player that reproduces voice or an image but a personal computer is included in data read-out equipment for optical disks (10). Data read-out equipment for optical disks (10) may be data read-out equipment only for CDs, and data read-out equipment only for DVDs, and may be CD and data read-out equipment for optical disks of DVD combination. moreover, a change to CLV or CAV of a rotary system by change means (21 26) -- an optical disk -- (-- every 11) -- carrying out -- **** -- it carries out and a good thing changed to CLV according to a condition in a certain condition so that it may be called CAV in a certain another condition also contains about one optical disk (11).

[0007] thus, a rotary system of the more suitable one about an optical disk (11) which set equipment (10) to a rotation driving means by carrying out data reading appearance for optical disks since it was not fixed to CLV or CAV but a rotary system of an optical disk (11) chose CLV and CAV -- data reading appearance -- carrying out -- carrying out -- improvement in a transmission rate, and the increase of a rotation driving means -- moderation -- a count -- control -- derating of a rotation driving means and power saving which are based can be aimed at.


[0008] Data read-out equipment for optical disks of this invention (10) has following (a) - (c).

(a) A set optical disk (11) A rotation driving means which carries out a rotation drive (b) An access method judging means (20) (c) access method judging means (20) to judge, respectively any are more advantageous between a sequential access and random access about data read-out of an optical disk (11) set to a rotation driving means Sequential access And a change means which changes a rotary system of an optical disk (11) by rotation driving means to CLV and CAV, respectively when random access is considered as a judgment for it to be advantageous (21 26)

[0009] A rotary system of an optical disk (11) is not fixed to CLV or CAV, but data read-out equipment for optical disks (10) can choose CLV and CAV now. and -- since it judges whether any have more advantageous data read-out from the optical disk (11) between CLV and CAV and data read-out from an optical disk (11) is carried out according to a rotary system of the more suitable one about an optical disk (11) with which an access method judging means (20) was set to a rotation driving means -- improvement in a transmission rate, and the increase of a rotation driving means - - moderation -- a count -- control -- derating of a rotation driving means and power saving which are based can be aimed at.

[0010] According to data read-out equipment for optical disks of this invention (10), an access method judging means (20) judges any are more advantageous between a sequential access and random access based on a class of optical disk (11).

[0011] It is in CD at a class of optical disk (11) in CD-AUDIO, VCD (Video CD), CD-EXTRA (CD extra: that from which an inner circumference [of CD] and periphery side serves as an audio data area and ROM area, respectively), photo CD (photograph CD), and CD-ROM. Moreover, there are DVD-VIDEO, DVD-AUDIO, and a DVD-ROM in DVD. A class of optical disk (11) becomes clear by investigating the CDC field and TOC of a lead-in groove zone. A rotary system is set to CAV, after examining an internal file content etc. uniformly or further when classes of optical disk (11) are CD-ROM and DVD-ROM since the CAV suitable for random access may be more advantageous in CD-ROM or DVD-ROM.

[0012] According to data read-out equipment for optical disks of this invention (10), an access method judging means (20) judges any are more advantageous between a sequential access and random access based on a file type currently recorded on an optical disk (11), length, and/or the number. 

[0013] A file type currently recorded on CD-ROM or DVD-ROM is distinguished from an extension. A data structure of CD-ROM is defined according to ISO9660, and a data structure of DVD-ROM is UDF. It defines according to Bridge. After reading a data structure into memory, it is detectable what kind of file is recorded. In an extension of a voice file, an extension of WAV and an image file serves as BMP and JPG. Since it becomes that to consider as a sequential access is more advantageous when reading them, since a voice file and an image file are long, those length (= size) sum totals set a rotary system of an optical disk (11) to CLV about an optical disk (11) which occupies beyond a predetermined value of all the file length sum totals in an optical disk (11), but it is referred to as CAV when that is not right. Moreover, although a rotary system of an optical disk (11) is set to CLV about an optical disk (11) with which each file length was investigated and all the file length sum totals of length beyond a predetermined value occupy beyond a predetermined value of all the file length sum totals in an optical disk (11), when that is not right, it is good also as CAV. Furthermore, the number of a file currently recorded on an optical disk (11) is investigated, it judges that random access is advantageous when the number is beyond a predetermined value, a rotary system is set to CAV, and it judges that a sequential access is advantageous when it is under a predetermined value, and is good also considering a rotary system as CLV.

[0014]

[Embodiment of the Invention] Hereafter, the gestalt of implementation of invention is explained with reference to a drawing. Drawing 1 is the block diagram of the principal part of CD-DVD combination data read-out equipment 10. Pickup 12 newly generates six factices' light beam by making a hologram pass the light beam (henceforth "the light beam of Maine") from one laser light source. A total of seven light beams of one light beam Maine's and six factices' newly generated light beam are irradiated by seven different trucks continuously located in a line to radial [of an optical disk 11], and incidence of each reflected light is carried out to the photodetector (not shown) of pickup 12, respectively. It is inputted into RF signal-processing block 13 in order that the output of a photodetector by which incidence was carried out may use the reflected light of the light beam of Maine as an error signal of a focus servo and a tracking servo. A total of six RF signals of the photodetector by which incidence was carried out in the reflected light of a factice's light beam are amplified being sent to EQ(equalizer)-AMP14 and waveform equalization being carried

out. The PLL block 15 generates a total of seven EFM signals, and sends these channel clock signal and an EFM signal to the recovery section 16 while it generates a channel clock signal for a total of seven RF signals of a total of six RF signals concerning the light beam of the factice from EQ-AMP14, and one RF signal concerning the light beam of Maine from RF signal-processing block 13 by PLL (Phase Locked Loop) processing. In the recovery section 16, the EFM signals of each channel are collected by MUX (multiplexer), it considers as serial data, an EFM recovery is carried out after that, and ECC (Error Correction Code: error correction and descrambling) processing is carried out. The lead-in groove information on which the optical disk 11 is recorded is written in the register of the ATAPI interface (AT Attachment Packet Interface) IC of the recovery section 16. In addition, an ATAPI interface is used for the data transmission and reception with a personal computer (not shown). CPU20 reads the contents of the register, detects the class of optical disk 11, and each file length, and sends the change signal of CAV and CLV to the servo processor 21 and DVD-DSP26. DVD-DSP26 processes by writing data suitably in memory 27. CPU20 takes out closing motion directions of a tray, and directions of a thread (it is d migration of an optical disk 11 to radial [of an optical disk 11]) to the servo processor 21 further. The servo processor 21 drives a driver 22 and controls the actuator for tray closing motion, and the actuator for threads. Motor Driver 28 fluctuates the drive current to the spindle motor (not shown) which carries out the rotation drive of the optical disk 11, and controls the rotational speed of a spindle motor. The control signal for CLV control of an optical disk 11 in case an optical disk 11 is CD is sent to Motor Driver 28 from the servo processor 21. The control signal for CLV control of an optical disk 11 in case an optical disk 11 is DVD is sent to Motor Driver 28 from DVD-DSP26. Motor Driver 28 sends FG signal of the frequency proportional to the rotational speed of a spindle motor to the servo processor 21. When carrying out CAV control of the optical disk 11, the servo processor 21 fluctuates the rotational speed of a spindle motor to Motor Driver 28 by making FG signal from Motor Driver 28 into a feedback signal, and attains a desired rotational speed.

[0015] Drawing 2 shows the relation between the class of DVD, and motor control. There are DVD-VIDEO, DVD-AUDIO, and a DVD-ROM in DVD, and when it is DVD-VIDEO and DVD-AUDIO, it considers as CLV motor control uniformly. In the case of DVD-ROM, according to the file type currently recorded on it, CLV motor control or CAV motor control is performed like the after-mentioned. ✓

[0016] Drawing 3 shows the relation between the class of CD, and motor control. It is in CD in CD-AUDIO, VCD (Video CD), CD-EXTRA (CD extra: that from which the inner circumference [of CD] and periphery side serves as an audio data area and ROM area, respectively), photo CD (photograph CD), and CD-ROM. In the case of CD-AUDIO, VCD, CD-EXTRA, and photo CD, it considers as CLV motor control uniformly. In the case of CD-ROM, according to the file type currently recorded on it, CLV motor control or CAV motor control is performed like the after-mentioned. ✓

[0017] A judgment of the CLV motor control at the time of being DVD-ROM and CD-ROM or CAV motor control is made as follows. With the set of the optical disk 11 to CD-DVD combination data read-out equipment 10, the lead-in groove zone of the optical disk 11 is read into the register of the ATAPI interface IC of the recovery section 16, and the list of the name of all the files of DVD-ROM and CD-ROM, size, etc. is written in it. CPU20 detects a file type from the extension of the file of an optical disk 11 with reference to this list. For example, there is WAV etc. in the extension of a voice file and there are BMP, JPG, etc. in the extension of an image file. A transmission rate increases [the direction which read them by the sequential access when reading these files, since such a voice file and an image file were long and had become a continuous file structure in size]. In therefore, the time of the rate of as opposed to the sum total size of all the files of an optical disk 11 in the sum total size of (a) voice file and an image file being beyond a predetermined value (b) in the time of the rate of as opposed to the sum total number of all the files of an optical disk 11 in the sum total number of a voice file and an image file being beyond a predetermined value or (c) -- or [when the number of the file of a continuous file structure is beyond a predetermined value] -- CLV motor control -- carrying out -- otherwise, -- coming -- that is, it considers as CAV motor control in the time of not being (c) the time of not being (a), and when it is not (b). ✓

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TECHNICAL FIELD

[A technical field to which invention belongs] This invention is CD (Compact Disk and DVD (data read-out equipment for optical disks which reads data from optical disks, such as Digital Versatile Disk, is started, and related with data read-out equipment for optical disks which improves read-out of data in detail.)).

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PRIOR ART

[Description of the Prior Art] There are CLV (Constant Linear Velocity) and CAV (Constant Angular Velocity) in the rotary system of the disk in the optical disk player and the optical disk drive which read data from CD or DVD. In a conventional optical disk player or a conventional optical disk drive, either CLV and CAV are fixing the rotary system separately.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] In the optical disk player which reproduces voice and an image As opposed to CLV to which data will be continuously read for a long time from an optical disk, and the rotary system of an optical disk was suitable for the sequential access being more advantageous In the optical disk drive used for data read-out in a personal computer Like data read-out from dictionary CD-ROM, when reading much short files frequently, a metaphor Whenever the disk radial truck location where the file which is going to read data as a rotary system is CLV is recorded changes While fluctuating the rotational speed of a spindle motor and leading to the fall of a transmission rate, it leads to the burden increase and power consumption increase of a spindle motor which are based on fluctuation of rotational speed, and the CAV is more advantageous.

[0004] The purpose of this invention is improving data read-out in the data read-out equipment for optical disks which reads data from an optical disk.

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MEANS

[Means for Solving the Problem] Data read-out equipment for optical disks of this invention (10) has the following (a) and (b).

(a) A change means which changes a rotary system of an optical disk (11) by the rotation (driving means b) rotation driving means which carries out the rotation drive of the set optical disk (11) to CLV or CAV (21 26) [0006] A change to CLV or CAV in a change means (21 26) includes not only an automatic change but a change by manual operation by user. CD and DVD are contained in an optical disk (11) at least. An optical disk drive used for data read-out of not only an optical disk player that reproduces voice or an image but a personal computer is included in data read-out equipment for optical disks (10). Data read-out equipment for optical disks (10) may be data read-out equipment only for CDs, and data read-out equipment only for DVDs, and may be CD and data read-out equipment for optical disks of DVD combination. moreover, a change to CLV or CAV of a rotary system by change means (21 26) -- an optical disk -- (-- every 11) -- carrying out -- **** -- it carries out and a good thing changed to CLV according to a condition in a certain condition so that it may be called CAV in a certain another condition also contains about one optical disk (11).

[0007] thus, a rotary system of the more suitable one about an optical disk (11) which set equipment (10) to a rotation driving means by carrying out data reading appearance for optical disks since it was not fixed to CLV or CAV but a rotary system of an optical disk (11) chose CLV and CAV -- data reading appearance -- carrying out -- carrying out -- improvement in a transmission rate, and the increase of a rotation driving means -- moderation -- a count -- control -- derating of a rotation driving means and power saving which are based can be aimed at.

[0008] Data read-out equipment for optical disks of this invention (10) has following (a) - (c).

(a) A set optical disk (11) A rotation driving means which carries out a rotation drive (b) An access method judging means (20) (c) access method judging means (20) to judge, respectively any are more advantageous between a sequential access and random access about data read-out of an optical disk (11) set to a rotation driving means Sequential access And a change means which changes a rotary system of an optical disk (11) by rotation driving means to CLV and CAV, respectively when random access is considered as a judgment for it to be advantageous (21 26) [0009] A rotary system of an optical disk (11) is not fixed to CLV or CAV, but data read-out equipment for optical disks (10) can choose CLV and CAV now. and -- since it judges whether any have more advantageous data read-out from the optical disk (11) between CLV and CAV and data read-out from an optical disk (11) is carried out according to a rotary system of the more suitable one about an optical disk (11) with which an access method judging means (20) was set to a rotation driving means -- improvement in a transmission rate, and the increase of a rotation driving means - moderation -- a count -- control -- derating of a rotation driving means and power saving which are based can be aimed at.

[0010] According to data read-out equipment for optical disks of this invention (10), an access method judging means (20) judges any are more advantageous between a sequential access and random access based on a class of optical disk (11).

[0011] It is in CD at a class of optical disk (11) in CD-AUDIO, VCD (Video CD), CD-EXTRA (CD extra: that from which an inner circumference [of CD] and periphery side serves as an audio data area and ROM area, respectively), photo CD (photograph CD), and CD-ROM. Moreover, there are DVD-VIDEO, DVD-AUDIO, and a DVD-ROM in DVD. A class of optical disk (11) becomes clear by investigating the CDC field and TOC of a lead-in groove zone. A rotary system is set to CAV, after examining an internal file content etc. uniformly or further when classes of optical disk (11) are CD-ROM and DVD-ROM since the CAV suitable for random access may be more advantageous in CD-

ROM or DVD-ROM.

[0012] According to data read-out equipment for optical disks of this invention (10), an access method judging means (20) judges any are more advantageous between a sequential access and random access based on a file type currently recorded on an optical disk (11), length, and/or the number.

[0013] A file type currently recorded on CD-ROM or DVD-ROM is distinguished from an extension. A data structure of CD-ROM is defined according to ISO9660, and a data structure of DVD-ROM is UDF. It defines according to Bridge. After reading a data structure into memory, it is detectable what kind of file is recorded. In an extension of a voice file, an extension of WAV and an image file serves as BMP and JPG. Since it becomes that to consider as a sequential access is more advantageous when reading them, since a voice file and an image file are long, those length (= size) sum totals set a rotary system of an optical disk (11) to CLV about an optical disk (11) which occupies beyond a predetermined value of all the file length sum totals in an optical disk (11), but it is referred to as CAV when that is not right. Moreover, although a rotary system of an optical disk (11) is set to CLV about an optical disk (11) with which each file length was investigated and all the file length sum totals of length beyond a predetermined value occupy beyond a predetermined value of all the file length sum totals in an optical disk (11), when that is not right, it is good also as CAV. Furthermore, the number of a file currently recorded on an optical disk (11) is investigated, it judges that random access is advantageous when the number is beyond a predetermined value, a rotary system is set to CAV, and it judges that a sequential access is advantageous when it is under a predetermined value, and is good also considering a rotary system as CLV.

[0014]

[Embodiment of the Invention] Hereafter, the gestalt of implementation of invention is explained with reference to a drawing. Drawing 1 is the block diagram of the principal part of CD-DVD combination data read-out equipment 10. Pickup 12 newly generates six factices' light beam by making a hologram pass the light beam (henceforth "the light beam of Maine") from one laser light source. A total of seven light beams of one light beam Maine's and six factices' newly generated light beam are irradiated by seven different trucks continuously located in a line to radial [of an optical disk 11], and incidence of each reflected light is carried out to the photodetector (not shown) of pickup 12, respectively. It is inputted into RF signal-processing block 13 in order that the output of a photodetector by which incidence was carried out may use the reflected light of the light beam of Maine as an error signal of a focus servo and a tracking servo. A total of six RF signals of the photodetector by which incidence was carried out in the reflected light of a factice's light beam are amplified being sent to EQ(equalizer)-AMP14 and waveform equalization being carried out. The PLL block 15 generates a total of seven EFM signals, and sends these channel clock signal and an EFM signal to the recovery section 16 while it generates a channel clock signal for a total of seven RF signals of a total of six RF signals concerning the light beam of the factice from EQ-AMP14, and one RF signal concerning the light beam of Maine from RF signal-processing block 13 by PLL (Phase Locked Loop) processing. In the recovery section 16, the EFM signals of each channel are collected by MUX (multiplexer), it considers as serial data, an EFM recovery is carried out after that, and ECC (Error Correction Code: error correction and descrambling) processing is carried out. The lead-in groove information on which the optical disk 11 is recorded is written in the register of the ATAPI interface (AT Attachment Packet Interface) IC of the recovery section 16. In addition, an ATAPI interface is used for the data transmission and reception with a personal computer (not shown). CPU20 reads the contents of the register, detects the class of optical disk 11, and each file length, and sends the change signal of CAV and CLV to the servo processor 21 and DVD-DSP26. DVD-DSP26 processes by writing data suitably in memory 27. CPU20 takes out closing motion directions of a tray, and directions of a thread (it is d migration of an optical disk 11 to radial [of an optical disk 11]) to the servo processor 21 further. The servo processor 21 drives a driver 22 and controls the actuator for tray closing motion, and the actuator for threads. Motor Driver 28 fluctuates the drive current to the spindle motor (not shown) which carries out the rotation drive of the optical disk 11, and controls the rotational speed of a spindle motor. The control signal for CLV control of an optical disk 11 in case an optical disk 11 is CD is sent to Motor Driver 28 from the servo processor 21. The control signal for CLV control of an optical disk 11 in case an optical disk 11 is DVD is sent to Motor Driver 28 from DVD-DSP26. Motor Driver 28 sends FG signal of the frequency proportional to the rotational speed of a spindle motor to the servo processor 21. When carrying out CAV control of the optical disk 11, the servo processor 21 fluctuates the rotational speed of a spindle motor to Motor Driver 28 by making FG signal from Motor Driver 28 into a feedback signal, and attains a desired rotational speed.

[0015] Drawing 2 shows the relation between the class of DVD, and motor control. There are DVD-VIDEO, DVD-

AUDIO, and a DVD-ROM in DVD, and when it is DVD-VIDEO and DVD-AUDIO, it considers as CLV motor control uniformly. In the case of DVD-ROM, according to the file type currently recorded on it, CLV motor control or CAV motor control is performed like the after-mentioned.

[0016] Drawing 3 shows the relation between the class of CD, and motor control. It is in CD in CD-AUDIO, VCD (Video CD), CD-EXTRA (CD extra: that from which the inner circumference [of CD] and periphery side serves as an audio data area and ROM area, respectively), photo CD (photograph CD), and CD-ROM. In the case of CD-AUDIO, VCD, CD-EXTRA, and photo CD, it considers as CLV motor control uniformly. In the case of CD-ROM, according to the file type currently recorded on it, CLV motor control or CAV motor control is performed like the after-mentioned.

[0017] A judgment of the CLV motor control at the time of being DVD-ROM and CD-ROM or CAV motor control is made as follows. With the set of the optical disk 11 to CD-DVD combination data read-out equipment 10, the lead-in groove zone of the optical disk 11 is read into the register of the ATAPI interface IC of the recovery section 16, and the list of the name of all the files of DVD-ROM and CD-ROM, size, etc. is written in it. CPU20 detects a file type from the extension of the file of an optical disk 11 with reference to this list. For example, there is WAV etc. in the extension of a voice file and there are BMP, JPG, etc. in the extension of an image file. A transmission rate increases [the direction which read them by the sequential access when reading these files, since such a voice file and an image file were long and had become a continuous file structure in size]. In therefore, the time of the rate of as opposed to the sum total size of all the files of an optical disk 11 in the sum total size of (a) voice file and an image file being beyond a predetermined value (b) in the time of the rate of as opposed to the sum total number of all the files of an optical disk 11 in the sum total number of a voice file and an image file being beyond a predetermined value or (c) -- or [when the number of the file of a continuous file structure is beyond a predetermined value] -- CLV motor control -- carrying out -- otherwise, -- coming -- that is, it considers as CAV motor control in the time of not being (c) the time of not being (a), and when it is not (b).

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram of the principal part of CD-DVD combination data read-out equipment 10.

[Drawing 2] It is drawing showing the relation between the class of DVD, and motor control.

[Drawing 3] It is drawing showing the relation between the class of CD, and motor control.

[Description of Notations]

10 CD-DVD Combination Data Read-out Equipment (Data Read-out Equipment for Optical Disks)

11 Optical Disk

20 CPU (Access Method Judging Means, Change Means)

21 Servo Processor (Change Means)

26 DVD-DSP (Change Means)

[Translation done.]

First Hit

Generate Collection

Print

L8: Entry 23 of 39

File: JPAB

May 30, 2000

PUB-NO: JP02000149415A

DOCUMENT-IDENTIFIER: JP 2000149415 A

TITLE: OPTICAL DISK, REPRODUCING DEVICE AND DUPLICATING DEVICE THEREOF, AND METHOD FOR PREVENTING ILLEGAL USE THEREOF

PUBN-DATE: May 30, 2000

INVENTOR-INFORMATION:

NAME

COUNTRY

TOZAKI, YOSHIHIRO

KAI, TSUTOMU

INOUE, SHINJI

SHIMADA, HIROMICHI

ASSIGNEE-INFORMATION:

NAME

COUNTRY

MATSUSHITA ELECTRIC IND CO LTD

APPL-NO: JP10312222

APPL-DATE: November 2, 1998

INT-CL (IPC): G11 B 20/10; G11 B 7/005; G11 B 19/02

ABSTRACT:

PROBLEM TO BE SOLVED: To provide a means capable of effectively preventing an illegal use of a DVD disk and other optical disks accompanied with a copyright infringement.

SOLUTION: When reproducing data information of a DVD disk 1, a DVD reproducing device judges whether or not the data information is protected by a copyright based on disk management information, and judges whether or not the DVD disk 1 is a recordable one based on the presence or absence of the wobble of the DVD disk 1. Thus, when the data information is protected by the copyright and the DVD disk 1 is a recordable one, this device is arranged so as to be able to effectively prevent an illegal use of the DVD disk 1 accompanied with a copyright infringement, by inhibiting reproduction of the DVD disk 1.

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[Claim(s)]

[Claim 1] (a) Data read-out equipment for optical disks characterized by having a rotation driving means which carries out the rotation drive of the set optical disk (11), and a change means (21 26) which changes a rotary system of said optical disk (11) by the (b) aforementioned rotation driving means to CLV or CAV.

[Claim 2] (a) A rotation driving means which carries out the rotation drive of the set optical disk (11), (b) An access method judging means to judge any are more advantageous between a sequential access and random access about data read-out of an optical disk (11) set to said rotation driving means (20), and (c) -- a change means (21 26) which changes a rotary system of said optical disk (11) by said rotation driving means to CLV and CAV, respectively when said access method judging means (20) considers a sequential access and random access as a judgment, respectively for it to be advantageous -- Data read-out equipment for optical disks characterized by ****(ing).

[Claim 3] said access method judging means (20) has advantageous any of a sequential access and random access based on a class of said optical disk (11) -- data reading appearance for optical disks according to claim 2 characterized by performing that judgment -- carrying out -- equipment.

[Claim 4] said access method judging means (20) has advantageous any of a sequential access and random access based on a file type currently recorded on said optical disk (11), length, and/or the number -- data reading appearance for optical disks according to claim 3 characterized by performing that judgment -- carrying out -- equipment.

[Translation done.]

*** NOTICES ***

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention is CD (Compact Disk and DVD (the data read-out equipment for optical disks which reads data from optical disks, such as Digital Versatile Disk, is started, and related with the data read-out equipment for optical disks which improves read-out of data in detail.)).

[0002]

[Description of the Prior Art] There are CLV (Constant Linear Velocity) and CAV (Constant Angular Velocity) in the rotary system of the disk in the optical disk player and the optical disk drive which read data from CD or DVD. In a conventional optical disk player or a conventional optical disk drive, either CLV and CAV are fixing the rotary system separately.

[0003]

[Problem(s) to be Solved by the Invention] In the optical disk player which reproduces voice and an image As opposed to CLV to which data will be continuously read for a long time from an optical disk, and the rotary system of an optical disk was suitable for the sequential access being more advantageous In the optical disk drive used for data read-out in a personal computer Like data read-out from dictionary CD-ROM, when reading much short files frequently, a metaphor Whenever the disk radial track location where the file which is going to read data as a rotary system is CLV is recorded changes While fluctuating the rotational speed of a spindle motor and leading to the fall of a transmission rate, it leads to the burden increase and power consumption increase of a spindle motor which are based on fluctuation of rotational speed, and the CAV is more advantageous.

[0004] The purpose of this invention is improving data read-out in the data read-out equipment for optical disks which reads data from an optical disk.

[0005]

[Means for Solving the Problem] Data read-out equipment for optical disks of this invention (10) has the following (a) and (b).

(a) A change means which changes a rotary system of an optical disk (11) by the rotation (driving means b) rotation driving means which carries out the rotation drive of the set optical disk (11) to CLV or CAV (21 26) [0006] A change to CLV or CAV in a change means (21 26) includes not only an automatic change but a change by manual operation by user. CD and DVD are contained in an optical disk (11) at least. An optical disk drive used for data read-out of not only an optical disk player that reproduces voice or an image but a personal computer is included in data read-out equipment for optical disks (10). Data read-out equipment for optical disks (10) may be data read-out equipment only for CDs, and data read-out equipment only for DVDs, and may be CD and data read-out equipment for optical disks of DVD combination. moreover, a change to CLV or CAV of a rotary system by change means (21 26) -- an optical disk -- (-- every 11) -- carrying out -- **** -- it carries out and a good thing changed to CLV according to a condition in a certain condition so that it may be called CAV in a certain another condition also contains about one optical disk (11).

[0007] thus, a rotary system of the more suitable one about an optical disk (11) which set equipment (10) to a rotation driving means by carrying out data reading appearance for optical disks since it was not fixed to CLV or CAV but a rotary system of an optical disk (11) chose CLV and CAV -- data reading appearance -- carrying out -- carrying out -- improvement in a transmission rate, and the increase of a rotation driving means -- moderation -- a count -- control -- derating of a rotation driving means and power saving which are based can be aimed at.


[0008] Data read-out equipment for optical disks of this invention (10) has following (a) - (c).

(a) A set optical disk (11) A rotation driving means which carries out a rotation drive (b) An access method judging means (20) (c) access method judging means (20) to judge, respectively any are more advantageous between a sequential access and random access about data read-out of an optical disk (11) set to a rotation driving means Sequential access And a change means which changes a rotary system of an optical disk (11) by rotation driving means to CLV and CAV, respectively when random access is considered as a judgment for it to be advantageous (21 26)

[0009] A rotary system of an optical disk (11) is not fixed to CLV or CAV, but data read-out equipment for optical disks (10) can choose CLV and CAV now. and -- since it judges whether any have more advantageous data read-out from the optical disk (11) between CLV and CAV and data read-out from an optical disk (11) is carried out according to a rotary system of the more suitable one about an optical disk (11) with which an access method judging means (20) was set to a rotation driving means -- improvement in a transmission rate, and the increase of a rotation driving means - - moderation -- a count -- control -- derating of a rotation driving means and power saving which are based can be aimed at.

[0010] According to data read-out equipment for optical disks of this invention (10), an access method judging means (20) judges any are more advantageous between a sequential access and random access based on a class of optical disk (11).

[0011] It is in CD at a class of optical disk (11) in CD-AUDIO, VCD (Video CD), CD-EXTRA (CD extra: that from which an inner circumference [of CD] and periphery side serves as an audio data area and ROM area, respectively), photo CD (photograph CD), and CD-ROM. Moreover, there are DVD-VIDEO, DVD-AUDIO, and a DVD-ROM in DVD. A class of optical disk (11) becomes clear by investigating the CDC field and TOC of a lead-in groove zone. A rotary system is set to CAV, after examining an internal file content etc. uniformly or further when classes of optical disk (11) are CD-ROM and DVD-ROM since the CAV suitable for random access may be more advantageous in CD-ROM or DVD-ROM.

[0012] According to data read-out equipment for optical disks of this invention (10), an access method judging means (20) judges any are more advantageous between a sequential access and random access based on a file type currently recorded on an optical disk (11), length, and/or the number. 

[0013] A file type currently recorded on CD-ROM or DVD-ROM is distinguished from an extension. A data structure of CD-ROM is defined according to ISO9660, and a data structure of DVD-ROM is UDF. It defines according to Bridge. After reading a data structure into memory, it is detectable what kind of file is recorded. In an extension of a voice file, an extension of WAV and an image file serves as BMP and JPG. Since it becomes that to consider as a sequential access is more advantageous when reading them, since a voice file and an image file are long, those length (= size) sum totals set a rotary system of an optical disk (11) to CLV about an optical disk (11) which occupies beyond a predetermined value of all the file length sum totals in an optical disk (11), but it is referred to as CAV when that is not right. Moreover, although a rotary system of an optical disk (11) is set to CLV about an optical disk (11) with which each file length was investigated and all the file length sum totals of length beyond a predetermined value occupy beyond a predetermined value of all the file length sum totals in an optical disk (11), when that is not right, it is good also as CAV. Furthermore, the number of a file currently recorded on an optical disk (11) is investigated, it judges that random access is advantageous when the number is beyond a predetermined value, a rotary system is set to CAV, and it judges that a sequential access is advantageous when it is under a predetermined value, and is good also considering a rotary system as CLV.

[0014]

[Embodiment of the Invention] Hereafter, the gestalt of implementation of invention is explained with reference to a drawing. Drawing 1 is the block diagram of the principal part of CD-DVD combination data read-out equipment 10. Pickup 12 newly generates six factices' light beam by making a hologram pass the light beam (henceforth "the light beam of Maine") from one laser light source. A total of seven light beams of one light beam Maine's and six factices' newly generated light beam are irradiated by seven different trucks continuously located in a line to radial [of an optical disk 11], and incidence of each reflected light is carried out to the photodetector (not shown) of pickup 12, respectively. It is inputted into RF signal-processing block 13 in order that the output of a photodetector by which incidence was carried out may use the reflected light of the light beam of Maine as an error signal of a focus servo and a tracking servo. A total of six RF signals of the photodetector by which incidence was carried out in the reflected light of a factice's light beam are amplified being sent to EQ(equalizer)-AMP14 and waveform equalization being carried

out. The PLL block 15 generates a total of seven EFM signals, and sends these channel clock signal and an EFM signal to the recovery section 16 while it generates a channel clock signal for a total of seven RF signals of a total of six RF signals concerning the light beam of the factice from EQ-AMP14, and one RF signal concerning the light beam of Maine from RF signal-processing block 13 by PLL (Phase Locked Loop) processing. In the recovery section 16, the EFM signals of each channel are collected by MUX (multiplexer), it considers as serial data, an EFM recovery is carried out after that, and ECC (Error Correction Code: error correction and descrambling) processing is carried out. The lead-in groove information on which the optical disk 11 is recorded is written in the register of the ATAPI interface (AT Attachment Packet Interface) IC of the recovery section 16. In addition, an ATAPI interface is used for the data transmission and reception with a personal computer (not shown). CPU20 reads the contents of the register, detects the class of optical disk 11, and each file length, and sends the change signal of CAV and CLV to the servo processor 21 and DVD-DSP26. DVD-DSP26 processes by writing data suitably in memory 27. CPU20 takes out closing motion directions of a tray, and directions of a thread (it is d migration of an optical disk 11 to radial [of an optical disk 11]) to the servo processor 21 further. The servo processor 21 drives a driver 22 and controls the actuator for tray closing motion, and the actuator for threads. Motor Driver 28 fluctuates the drive current to the spindle motor (not shown) which carries out the rotation drive of the optical disk 11, and controls the rotational speed of a spindle motor. The control signal for CLV control of an optical disk 11 in case an optical disk 11 is CD is sent to Motor Driver 28 from the servo processor 21. The control signal for CLV control of an optical disk 11 in case an optical disk 11 is DVD is sent to Motor Driver 28 from DVD-DSP26. Motor Driver 28 sends FG signal of the frequency proportional to the rotational speed of a spindle motor to the servo processor 21. When carrying out CAV control of the optical disk 11, the servo processor 21 fluctuates the rotational speed of a spindle motor to Motor Driver 28 by making FG signal from Motor Driver 28 into a feedback signal, and attains a desired rotational speed.

[0015] Drawing 2 shows the relation between the class of DVD, and motor control. There are DVD-VIDEO, DVD-AUDIO, and a DVD-ROM in DVD, and when it is DVD-VIDEO and DVD-AUDIO, it considers as CLV motor control uniformly. In the case of DVD-ROM, according to the file type currently recorded on it, CLV motor control or CAV motor control is performed like the after-mentioned. ✓

[0016] Drawing 3 shows the relation between the class of CD, and motor control. It is in CD in CD-AUDIO, VCD (Video CD), CD-EXTRA (CD extra: that from which the inner circumference [of CD] and periphery side serves as an audio data area and ROM area, respectively), photo CD (photograph CD), and CD-ROM. In the case of CD-AUDIO, VCD, CD-EXTRA, and photo CD, it considers as CLV motor control uniformly. In the case of CD-ROM, according to the file type currently recorded on it, CLV motor control or CAV motor control is performed like the after-mentioned. ✓

[0017] A judgment of the CLV motor control at the time of being DVD-ROM and CD-ROM or CAV motor control is made as follows. With the set of the optical disk 11 to CD-DVD combination data read-out equipment 10, the lead-in groove zone of the optical disk 11 is read into the register of the ATAPI interface IC of the recovery section 16, and the list of the name of all the files of DVD-ROM and CD-ROM, size, etc. is written in it. CPU20 detects a file type from the extension of the file of an optical disk 11 with reference to this list. For example, there is WAV etc. in the extension of a voice file and there are BMP, JPG, etc. in the extension of an image file. A transmission rate increases [the direction which read them by the sequential access when reading these files, since such a voice file and an image file were long and had become a continuous file structure in size]. In therefore, the time of the rate of as opposed to the sum total size of all the files of an optical disk 11 in the sum total size of (a) voice file and an image file being beyond a predetermined value (b) in the time of the rate of as opposed to the sum total number of all the files of an optical disk 11 in the sum total number of a voice file and an image file being beyond a predetermined value or (c) -- or [when the number of the file of a continuous file structure is beyond a predetermined value] -- CLV motor control -- carrying out -- otherwise, -- coming -- that is, it considers as CAV motor control in the time of not being (c) the time of not being (a), and when it is not (b).

[Translation done.]